

Cross-sectional Anatomy Tutor

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As clinical medicine increasingly relies on cross-sectional imaging, anatomy education needs to address more effective and efficient methods of integrating instruction on cross-sectional anatomy and interpretation of related imaging modalities. A computer-based program, developed at Duke University, enables first-year medical students to identify normal anatomical structures on whole body cross-sections and correlate them with their appearance on computed tomography (CT) and magnetic resonance (MR) images. Practice in applying this knowledge to clinical problem-solving is also included.

A major advantage of this program is that the whole body images, CT, and MR images are from the same normal, disease-free cadaver, allowing for direct comparison of identical structures across image types. The program incorporates selected images from the National Library of Medicine's "Visible Human" dataset. This remarkable dataset consists of digitized cross-sectional photographs of a single cadaver, at one millimeter intervals from head to toe, along with the corresponding CT and MR images.

"Cross-sectional Anatomy Tutor" features an interactive tutorial, an animated orientation to cross-sectional imaging, clinical case studies, and a test section.

The tutorial covers sequential cross-sections of the head and neck, thorax, abdomen and pelvis. Students are required to correctly name a structure outlined on the image and to correctly "point" to a given

structure. Remedial feedback is provided for each response. Users switch between image types at any time and may move "up or down" between body levels as desired. An atlas is available for side-by-side comparison of images.

The orientation to cross-sectional imaging illustrates concepts and techniques used in computed tomography, including grey scale, windowing and contrast media, and orients the student to cross-sectional views.

The clinical case studies present a brief history and accompanying CT scans that require interpretation of the images in making the correct diagnosis. The cases provide valuable practice in applying knowledge, as well as motivating and enhancing student interest.

The test section features randomly-generated tests on structures pulled from the entire contents of the program's image files. Two "practice" tests and one "final exam" may be taken at any time. Students may review any incorrect answers on completing a test. The "final exam" score is recorded to a dbase file for instructor review. A built-in security protocol requires each student's social security number on entering the test section. Additional security checks help to assure the instructor of the authenticity of each student's exam.

The program runs on a PC platform with 256 colors and was developed with AimTech's IconAuthor multimedia authoring tool.